

WHAT IS CLAIMED IS:

1. An electron source forming substrate provided
with an insulating material layer on a surface of a
substrate, at which surface an electron emitting device
5 is disposed, wherein the insulating material layer has
a plurality of partially exposed metal oxide particles
on its surface.

2. An electron source forming substrate provided
10 with an insulating material layer on a surface of a
substrate, at which surface an electron emitting device
is disposed, wherein the insulating material layer has
a plurality of partially exposed metal oxide particles
on its surface and a plurality of enclosed metal oxide
15 particles.

3. An electron source forming substrate according
to Claim 2, wherein the plurality of enclosed metal
oxide particles form a metal oxide particle layer in
20 the insulating material layer between the substrate
surface and the surface of the insulating material
layer.

4. An electron source forming substrate according
25 to Claim 2, wherein the plurality of enclosed metal
oxide particles and the plurality of partially exposed
metal oxide particles form a metal oxide particle layer

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in the insulating material layer between the substrate surface and the surface of the insulating material layer.

5 5. An electron source forming substrate according to one of Claims 2 through 4, wherein the average particle size of the plurality of metal oxide particles partially exposed on the surface of the insulating material layer is larger than the average particle size
10 of the plurality of metal oxide particles enclosed in the insulating material layer.

6. An electron source forming substrate according to one of Claims 2 through 4, wherein the average
15 particle size of the plurality of metal oxide particles partially exposed on the surface of the insulating material layer is in the range of 50 nm to 70 nm, and wherein the average particle size of the plurality of metal oxide particles enclosed in the insulating
20 material layer is in the range of 6 nm to 40 nm.

7. An electron source forming substrate according to one of Claims 2 through 4, wherein the average particle size of the plurality of metal oxide particles partially exposed on the surface of the insulating material layer is 60 nm, and wherein the average
25 particle size of the plurality of metal oxide particles

enclosed in the insulating material layer is in the range of 6 nm to 40 nm.

8. An electron source forming substrate according
5 to one of Claims 1 and 2, wherein the substrate is one containing sodium.

9. An electron source forming substrate according
to Claim 8, wherein the insulating material layer is a
10 sodium blocking layer.

10. An electron source forming substrate according to one of Claims 1 and 2, wherein the insulating material layer is an antistatic layer.

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11. An electron source forming substrate provided with an SiO₂ layer on a surface of a substrate, at which surface an electron-emitting device is disposed, wherein the SiO₂ layer has a plurality of partially exposed metal oxide particles on the surface.
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12. An electron source forming substrate comprising a substrate having an electron-emitting device, and an SiO₂ layer provided on the surface of the substrate, wherein the SiO₂ layer has a plurality of partially exposed metal oxide particles on its surface, and a plurality of enclosed metal oxide particles.
and a plurality of enclosed metal oxide particles.

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13. An electron source forming substrate
according to Claim 12, wherein the plurality of
enclosed metal oxide particles form a metal oxide
particle layer in the SiO₂ layer between the substrate
5 surface and the surface of the SiO₂ layer.

14. An electron source forming substrate
according to Claim 12, wherein the plurality of
enclosed metal oxide particles and the plurality of
10 partially exposed metal oxide particles form a metal
oxide particle layer in the SiO₂ layer between the
substrate surface and the surface of the SiO₂ layer.

15. An electron source forming substrate
15 according to one of Claims 12 through 14, wherein the
average particle size of the plurality of metal oxide
particles partially exposed on the surface of the SiO₂
layer is larger than the average particle size of the
plurality of metal oxide particles enclosed in the SiO₂
20 layer.

16. An electron source forming substrate
according to one of Claims 12 through 14, wherein the
average particle size of the plurality of metal oxide
25 particles partially exposed on the surface of the SiO₂
layer is in the range of 50 nm to 70 nm, and wherein
the average particle size of the plurality of metal

oxide particles enclosed in the SiO₂ layer is in the range of 6 nm to 40 nm.

17. An electron source forming substrate
5 according to one of Claims 12 through 14, wherein the average particle size of the plurality of metal oxide particles partially exposed on the surface of the SiO₂ layer is 60 nm, and wherein the average particle size of the plurality of metal oxide particles enclosed in 10 the SiO₂ layer is in the range of 6 nm to 40 nm.

18. An electron source forming substrate according to one of Claims 11 and 12, wherein the substrate is one containing sodium.

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19. An electron source forming substrate according to Claim 18, wherein the SiO₂ layer is a sodium blocking layer.

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20. An electron source forming substrate according to one of Claims 11 and 12, wherein the SiO₂ layer is an antistatic layer.

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21. An electron source forming substrate according to one of Claims 1, 2, 11 and 12, wherein the metal oxide particles are electron conductive oxide particles.

22. An electron source forming substrate
according to one of Claims 1, 2, 11 and 12, wherein the
metal oxide particles are particles of an oxide of a
metal selected from the following metals: Fe, Ni, Cu,
5 Pd, Ir, In, Sn, Sb, and Re.

23. An electron source forming substrate
according to one of Claims 1, 2, 11 and 12, wherein the
metal oxide particles are SiO₂ particles.

10 24. An electron source comprising a substrate and
an electron-emitting device arranged on the substrate,
wherein the substrate is an electron source forming
substrate as claimed in one of Claims 1, 2, 11 and 12.

15 25. An electron source according to Claim 24,
wherein the electron-emitting device is one provided
with an electroconductive film containing an electron-
emitting region.
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26. An electron source according to Claim 24 or
25, wherein a plurality of electron-emitting devices
are arranged in a matrix wiring composed of a plurality
25 of row-directional wirings and a plurality of column-
directional wirings.

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27. An image display apparatus comprising an envelope, an electron-emitting device arranged in the envelope, and an image display member adapted to display images through application of electrons from the electron-emitting device, wherein a substrate on which the electron-emitting device is arranged is an electron source forming substrate as claimed in one of Claims 1, 2, 11 and 12.

10 28. An image display apparatus according to Claim 27, wherein the electron-emitting device is one provided with an electroconductive film containing an electron-emitting region.

15 29. An image display apparatus according to Claim 27, wherein a plurality of electron-emitting devices are arranged in a matrix wiring composed of a plurality of row-directional wirings and a plurality of column-directional wirings.

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